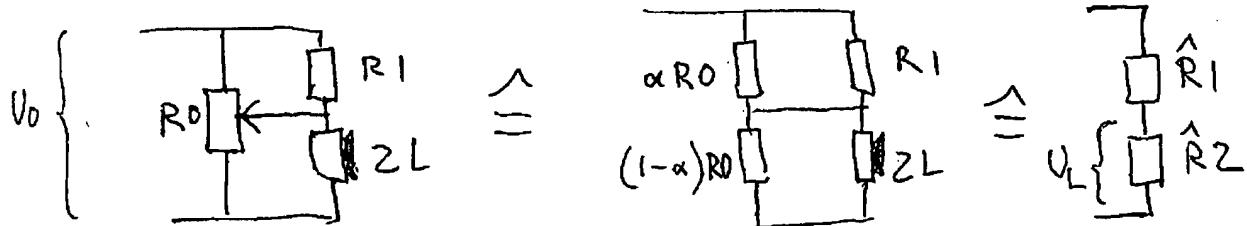


Appendix A ISCHOLZ

$\alpha$  represents a value from 0 - 1

(attenuation according to position of switch)

$$\hat{R}_1 = \frac{\alpha R_0 \cdot R_1}{\alpha R_0 + R_1}, \quad \hat{R}_2 = \frac{(1-\alpha) R_0 \cdot Z_L}{(1-\alpha) R_0 + Z_L}$$

$$U_L = \frac{\hat{R}_2}{\hat{R}_1 + \hat{R}_2} U_0 = \frac{1}{1 + \frac{\hat{R}_1}{\hat{R}_2}} U_0 = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) R_0 + Z_L}{\alpha R_0 + R_1}}$$

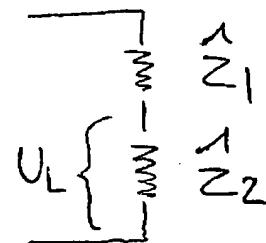
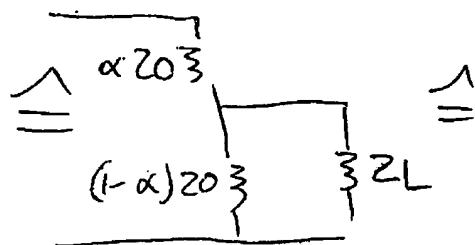
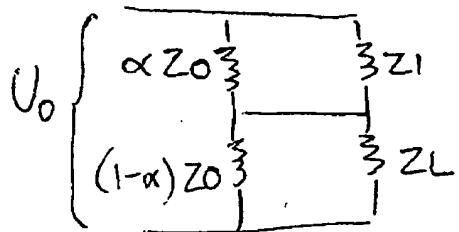
If assumed that  $Z_L < R_0$  (SCHOLZ requires  $R_1 + Z_L \leq R_0$ )

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L} \cdot \frac{(1-\alpha) R_0}{\alpha R_0 + R_1}} U_0 \approx \frac{1}{1 + \alpha \frac{R_0}{Z_L}} U_0$$

Because  $Z_L$  is frequency-dependent ( $R_2 - i\omega L$ ) the voltage  $U_L$  is not in constant relation to  $U_0$

Appendix A

II



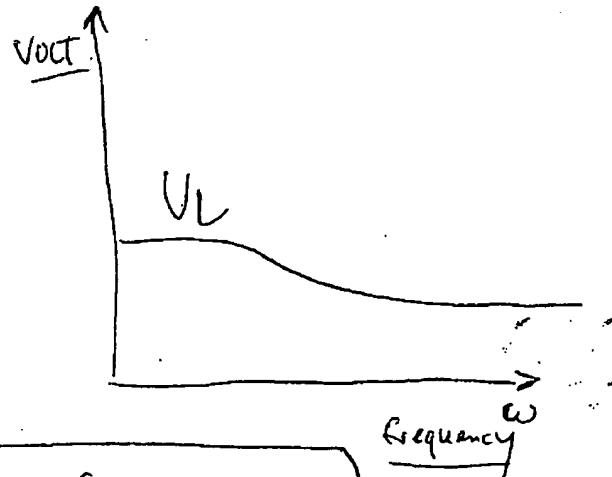
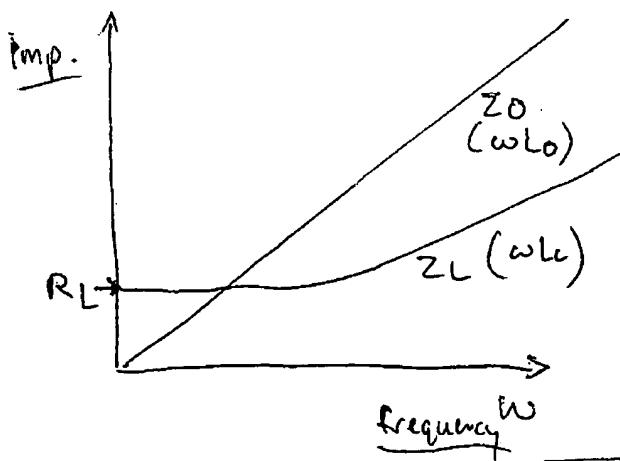
$$U_L = \frac{1}{1 + \frac{Z_1}{Z_2}} = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot \frac{(1-\alpha)Z_0 + Z_L}{Z_L}} U_0$$

For low frequencies  
( $Z_0 \ll Z_L$ )

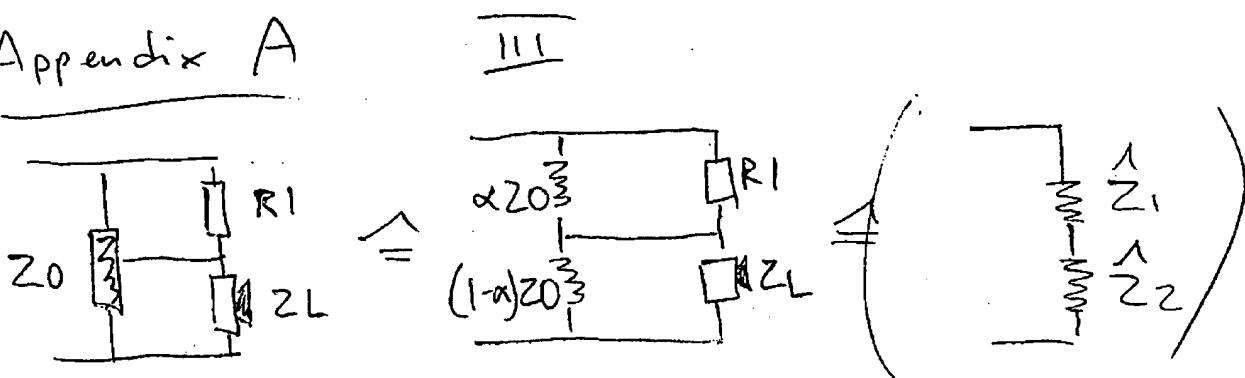
$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right)} U_0$$

For high frequencies  
( $Z_L \ll Z_0 \approx -i\omega L_0$ )

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot \frac{(1-\alpha)L_0}{Z_L}}$$



Frequency-dependent in first order

Appendix A

see I

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R_1}{Z_L}} \cdot \frac{(1-\alpha)Z_0 + Z_L}{\alpha Z_0 + R_1} U_0$$

$Z_0$  is in approximate proportion to  $Z_L \Rightarrow z_0 = \beta z_L$

$R_1$  is larger than  $Z_0 \Rightarrow \alpha Z_0 + R_1 \approx R_1$

$$U_L \approx \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \cdot [1 + \beta(1-\alpha)]} U_0$$

no frequency-dependence in first order!